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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,264	10/27/2003	Leonid Romanov	12355-009001	4696
26161	7590	05/17/2005	EXAMINER	
FISH & RICHARDSON PC 225 FRANKLIN ST BOSTON, MA 02110			SUNG, CHRISTINE	
			ART UNIT	PAPER NUMBER
			2878	

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/695,264	<b>Applicant(s)</b> ROMANOV ET AL. <span style="float: right;">(PM)</span>	
	<b>Examiner</b> Christine Sung	<b>Art Unit</b> 2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 October 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-60 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-46 is/are allowed.
- 6) ☒ Claim(s) 58-60 is/are rejected.
- 7) ☒ Claim(s) 47-57 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>0204</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 47-57 are objected to because of the following informalities: Claim 47 has a typographical error on page 25, line 3. The claim reads “layerincluding” but should read --layer including-- The balance of claims are objected to for being dependent on an already objected claim. Appropriate correction is required.
2. Claim 58 is objected to because of the following informalities: The claim recites the limitations “means for an outer and inner the spatial light distribution,” which makes the claim unclear. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 58-60 rejected under 35 U.S.C. 102(b) as being anticipated by Cherry et al. (US Patent 5,719,400A).

Regarding claim 58, Cherry discloses a PET scanner (figure 1) comprising: a scintillator block (element 12) for generating a spatial light distribution of scintillation photons in response to illumination by a gamma ray photon (claim 1); means for an outer (element 15) and inner walls (element 17) that generate spatial light distribution of scintillation photons to generate a modified spatial light distribution; and a plurality of photodetectors (element 18) for receiving the modified spatial light distribution from the outer and inner means.

Regarding claim 59, Cherry discloses an optical element (element 16) for directing light from a scintillator block (element 12) to a plurality of photodetectors (element 18), the optical element comprising: a structured outer layer (element 15) in optical communication with the scintillator block; and a structured inner layer (element 17) in optical communication with the plurality of photodetectors.

Regarding claim 60, Cherry discloses a gamma detector (Figure 1) comprising: a scintillator block (element 12); a plurality of photodetectors (element 18); an optical element (element 16), the optical element being disposed between the scintillator block and the plurality of photodetectors (see figure 1).

***Allowable Subject Matter***

5. Claims 1-57 are allowed.

6. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 1-57, none of the prior art of record discloses a PET scanner or and optical element, namely the specific layering of the optical element, wherein the optical element has a first layer that has a central region having an outer wall and a peripheral region having an inner wall that is separated by a gap and a second layer that is in optical communication with the first layer that has at least a first and second region that have interior walls that are separated by a gap. Although references such as Cherry (US Patent 5,791,400) disclose an optical element that increases the spatial resolution, Cherry does not specify that the optical element has a first layer with a gap between the inner an peripheral regions followed by a second layer that is optically coupled to the first layer that has a first and second region that are separated by another gap. The

configuration of the optical element allows for greater accuracy in determining the spatial position of the detected radiation. Conventionally, radiation enters the scintillator and causes an event which releases light which is then detected by the photodetector. Because the light emitted from the scintillator disperses it is often difficult to determine spatially where the event occurred with respect to the position on the scintillator. Prior art references such as Cherry, try to alleviate this problem using an optical element such as a segmented waveguide or fiber optic cable, or other conventional methods such as grids, in order to bias emitted light to a particular photodiode to indicate the positioning of the detector. The instant application discloses an optical element that is layered, such the light passes through the first layer with a particular pattern, then passes through the second layer with a different pattern. The overlay of the two patterns will show with greater precision the likely spatial region the event originated from.

### *Conclusion*

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
8. US Patent 5,719,400- this reference discloses an optical element that made of optical fibers corresponding to specific location of the face of the PMT.
9. US Patent 6,828,564- this reference is a commonly assigned reference.
10. US Patent 6,362,479- this reference discloses increasing spatial position by using stacked scintillators to determine the origin of the event.
11. US Patent 6,462,341- this reference discloses an optical member that uses flat or curved optical elements for segmenting the events to a given photomultiplier.

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12. US Patent 5,783,829- this reference discloses a photomultiplier that uses an optical element such as wave shifting optical fibers to detect the position of the event.

13. US Pre Grant Publication 2004/0004188 A1- this reference discloses increasing spatial resolution of the detector by offsetting the detector array to determine the spatial position.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Sung whose telephone number is 571-272-2448. The examiner can normally be reached on Monday- Friday 7-3 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christine Sung  
Examiner  
Art Unit 2878

CS

